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12-14 June 2007, at US Naval Academy, Annapolis, MD

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Report Documentation Page

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The United States Military Entrance Processing Command (USMEPCOM) uses Six Sigma Process to Develop and Improve Data Quality

MAJ Mark Gorak
Mr. Rick Cox

June 13th, 2007

Freedom's Front Door

Agenda

- USMEPCOM Overview/History
- Purpose
- Define: *What is Important?*
  - Team Charter
  - Cause/Effect Summary
  - Customer Survey Results
- Measure: *How are we doing?*
- Analyze: *What is wrong?*
- Improve: *What needs to be done?*
- Control: *How do we guarantee performance?*
- Way Ahead
- Questions

USMEPCOM Overview

Mission

Ensure the quality of military accessions during peacetime and mobilization in accordance with established standards.

Vision

USMEPCOM is recognized as a customer-centered, future-focused learning organization driven by best business practices and cutting-edge technology, providing real-time entrance processing and qualification.

Organization

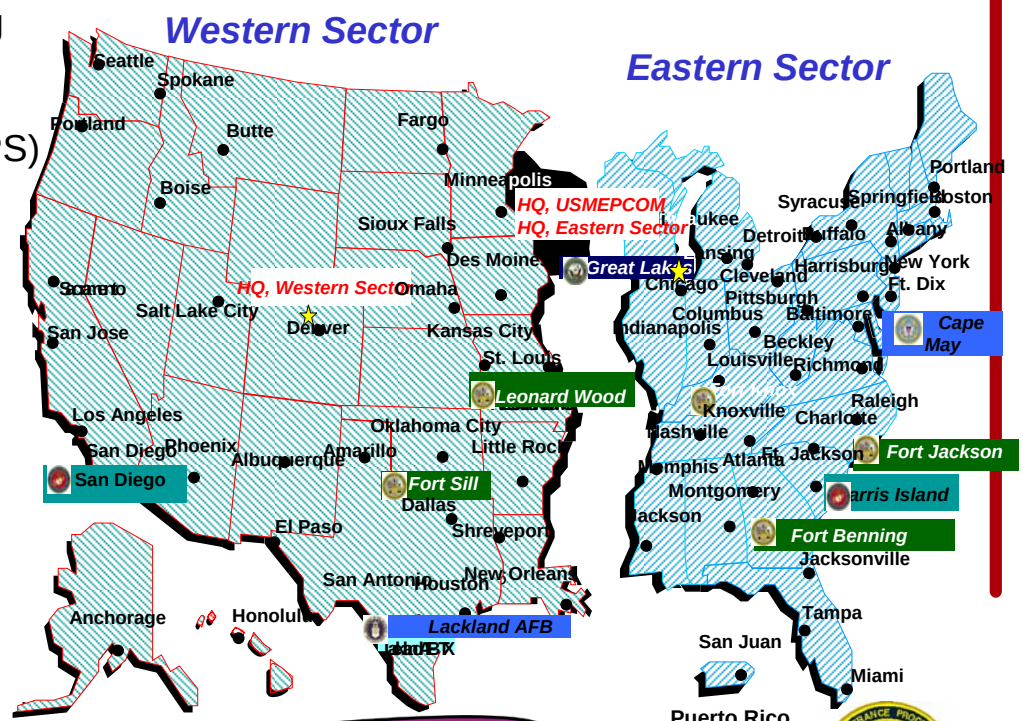
-HQ's co-located at Great Lakes Naval Training Base
-2 Sectors
-65 Military Entrance Processing Stations (MEPS)
-Supports all uniform services

Resources

Budget: $195 million annually

	Authorized	Assigned
Total Military:	1405	1480
Total Civilian:	1386	1275

Facilities: 67 Across the Nation
Fixed costs: 30% of budget



Freedom's Front Door

Introduction

- How accurate is your data?
- How do you Know?
- This brief provides a Six Sigma methodology used to answer this question.

Purpose

- Provide Information on USMEPCOM's Data Quality Metric.
- Initial Request from Office of the Under Secretary of Defense for Personnel & Readiness Information Management (OUSD P&R IM).
  - Focus area: Establishing and reporting measurements for capability-level metrics.
  - Collect metrics to report to Congressional Report/Enterprise Transition Plan. One of the metrics being collected is:
    - Accuracy of Accession Information - This is defined as the percentage of accessions that are accurately tracked.
    - Can USMEPCOM provide information on how you are currently collecting the above information?
    - For example, what are the data sources (system/initiative, reports, other sources)? How often are they reported? How hard are they to collect? What formulas are utilized in the capturing and recording of metrics.
- Define and implement USMEPCOM's data quality metrics to ensure data quality for the accessions community.
  - How accurate is our data? How do we know?
  - What metrics do we use to track data quality?
  - Who monitors/tracks?
  - Who is responsible?

Facts

- USMEPCOM requested to provide data quality metrics for quarterly reports to Congress by P&R IM.
- USMEPCOM had no existing capability to measure and report the Quality of accession data.
- USMEPCOM Data Quality Team used a Six Sigma approach to established data quality metrics.

Assumptions

- It is in USMEPCOM's strategic and operational interest to be able to measure and report on the quality of key mission and mission-support data.
- OSD will continue requesting that USMEPCOM provide data quality information.
- USMEPCOM is able, within current funding and staffing levels, to design and implement a practical, effective, and efficient capability to measure and report key elements of data quality.
- *USMEPCOM's long term value to the accession triad is data.*

Team Charter

D M A I C

Project : Improve USMEPCOM Accession Data Quality

Business Case

• Improve USMEPCOM data quality, and establish a data quality standard.
• Data Quality is a function of accuracy, validity, timeliness, and transmission reliability
• Communicate to stakeholders USMEPCOM's data quality.

Goal Statement

Improve USMEPCOM monthly data quality to reach standard of 99%.

Project Plan

Task/Phase
• Phase 1: Initial Response to P&R IM NLT 02JUN
• Phase 2: Develop USMEPCOM data quality metric
  • Finalize Charter: NLT 02MAY06
  • Gather Data: NLT 25SEP06
  • Analyze Data: NLT 01OCT06
  • Select Solution: NLT 01NOV06
  • Develop Plan to implement: NLT 30NOV
  • Closure and Recognition: NLT 31DEC.

Opportunity Statement

• Improve credibility with stakeholders
• Improve MEPS business process
• Improve USMEPCOM relevance as data providers
• Increase effective communication
• Track business rules/data collection changes over time
• Establish data warehouse
• Improve data business rules

Project Scope

• Focus on Accession data
• Identify key data fields (Stakeholder Focus)
• Focus on fields that create DEERS record
• Best business practices (HMO's…)
• Policy implementation
• Data accountability

Team Members

Champion: Mr. O'Brien
Black Belts: MAJ Mark Gorak / Rick Cox
Process Owner : J5
Member: J3: Don Hill/Theresa Morris/Tom Buehring
Member: J6: Bill Armstrong/Bernard Underwood
Member: J7: SMSGT Dean Dzurovcin
Member: J8: Rich Harris/Mike Arsenault
Member: IG: David Hamby

Freedom's Front Door

Critical Customer Requirements
Survey of Key Stakeholders

D M A I C

Conducted 17-Question Survey of DADSIWG members.

- How would you rate the ACCURACY of USMEPCOM data?
  - 50% of respondents felt accuracy was 90% or less, or didn't know
- How important is it to the accession community for USMEPCOM data to be accurate?
  - 100% said "Extremely Important"
- Comments
  - "*Senior leaders make policy decisions based on the data we get from USMEPCOM. If inaccurate, decisions made are faulty and can have adverse political and financial impacts."*
  - "*SECDEF and other senior leaders expect and want timely and up to date answers to their questions. Today we will have to wait a week or so for the data to be loaded is totally unacceptable.*"

Definitions

Data Quality: A function of accuracy, validity, timeliness, and transmission reliability.

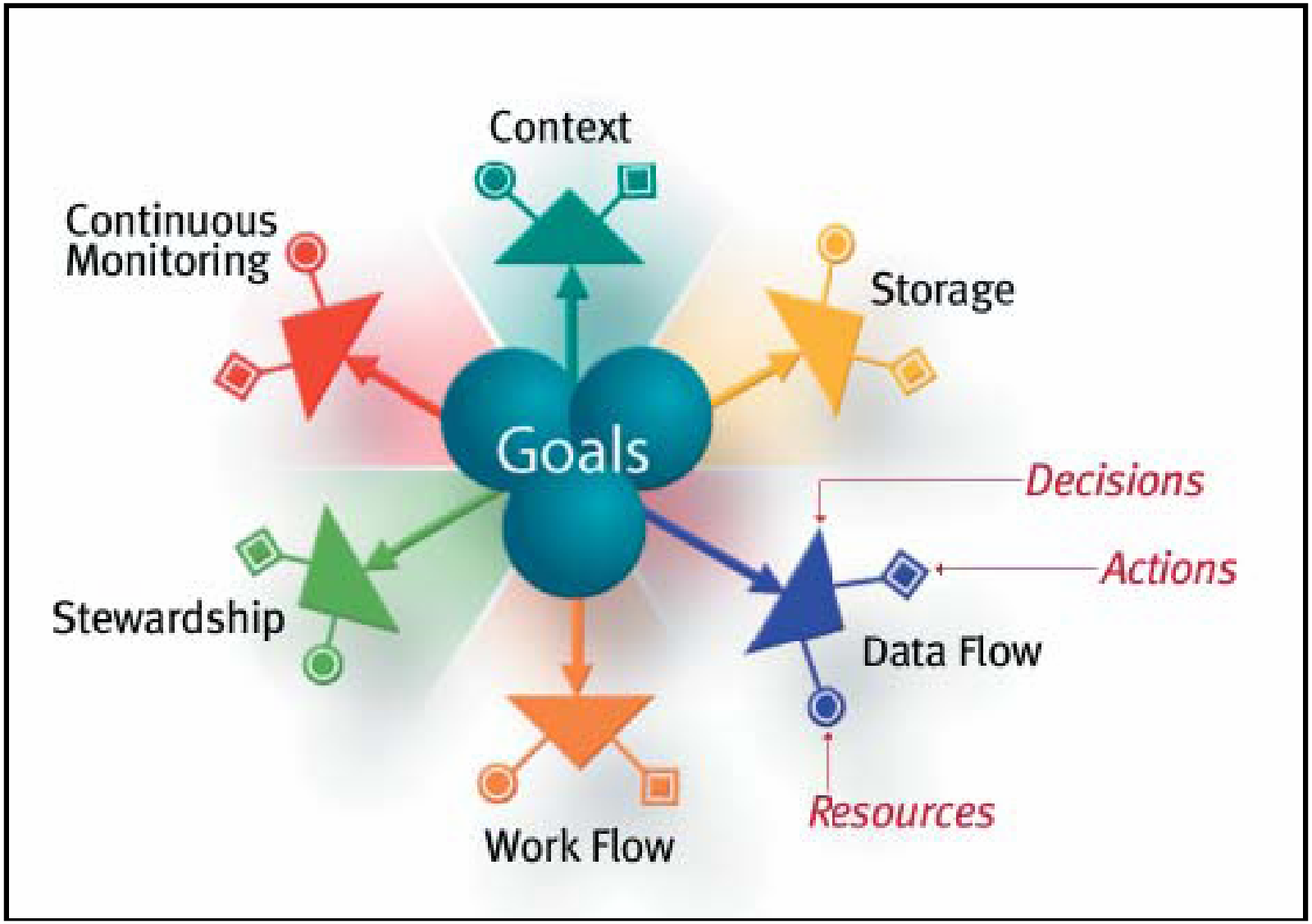
- Data Accuracy:
  - Conformity to fact. Exactness. The ability of a measurement to match the actual value of the quantity being measured.
  - Accuracy refers to whether the data correctly records the business object or event it represents. It has two requirements: it must be the right value and it must represent the value in a consistent form with all other representations of the same value.

- Data Validity:
  - Used to find invalid data, not all inaccurate data.
  - Data entered into data field corresponds to a valid domain range value for that field. (Address field has valid address)
  - Data Representation: A text field containing the name of a state may have entries for TX, TEXAS and texas. To someone looking at a report, this might not be a problem, however, to data queries this poses several problems.

- Timeliness:
  - Available to data users when and where needed.
  - Data is reported within prescribed timelines.

- Transmission Reliability:
  - Data element is complete; entered into system and is accounted for from data entry point to data delivery to customer (DMDC).

Data Quality Factors



SIPOC

USMEPCOM Accession Data Flow

Start Boundary: Record Build into MIRS

End Boundary: USEMPCOM sends accession data to DMDC

Suppliers	Inputs	PROCESS	Outputs	Customers
Recruiters	MEPS - MIRS		Applicant Accession Data	Services
Applicants	Service - MIRS (AF, Navy, CG)		Applicant Information (15K	DMDC
MEPS	MCRISS / ARISS		QuICR	Directorates
SSA	SSA (response)			OSD-AP
DMDC	DMDC (Prior Service)		SSA	
Lab's	Drug Lab		FBI (BK Check)	
	HIV			

STEPS: See next slide: US MIRS Data Flow

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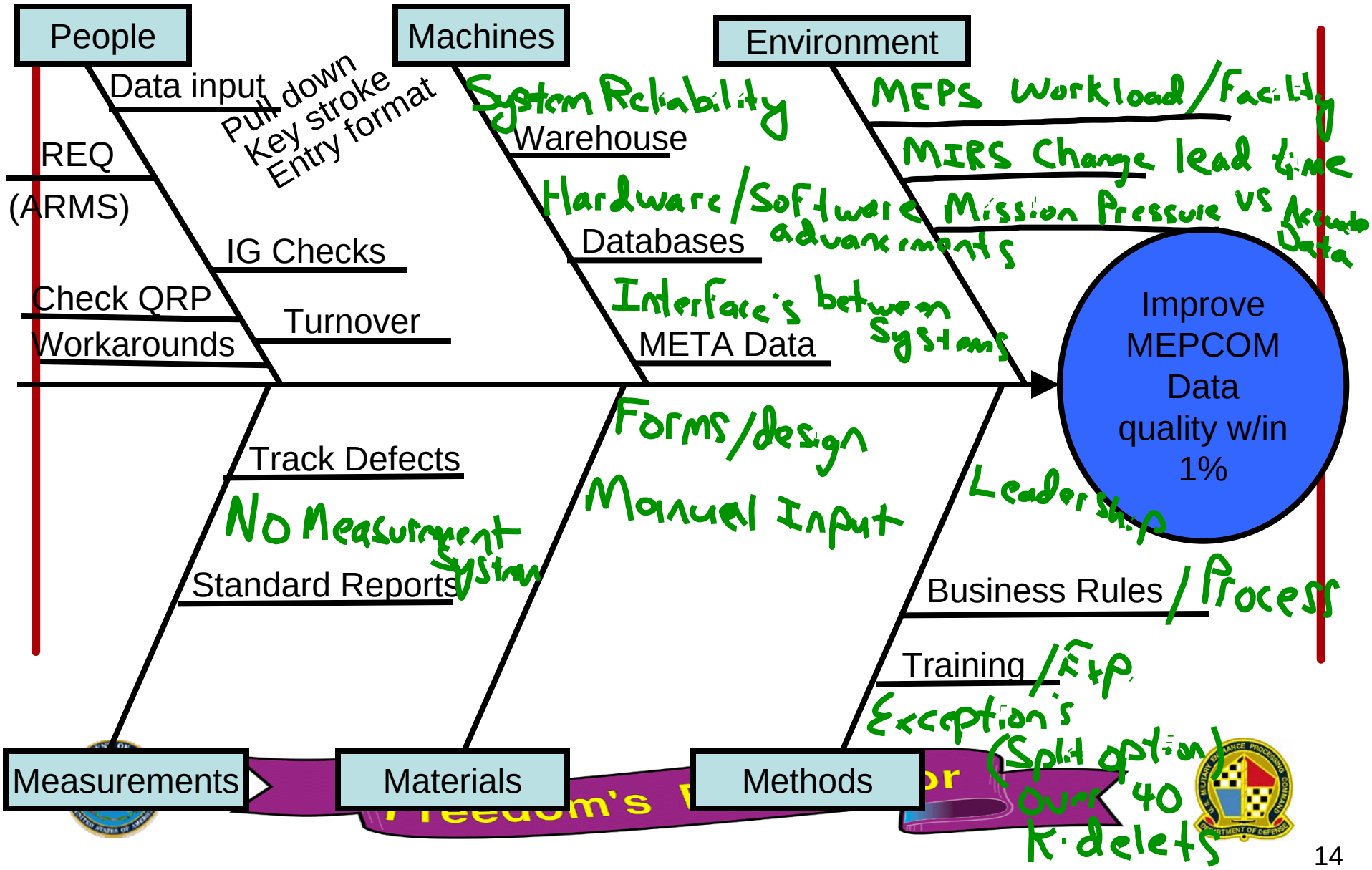
Cause – Effect Diagram

D M A I C



Methodology Results: Cause/Effect Summary

High Direct Impact on Data Quality

1. System Interfaces: (# of transmission failures & validity of edits between systems (*Need feedback from interface partners)*)
2. Tracking Defects: # of Mismatches (POB, DOB, SSN, USCIS code, etc.)
3. External Requirements: # of Change Requests per month,
4. Data Definitions: Incorrect definitions or changes to Data Def
5. Data Input Methods: # of fingerprint error (mismatch/error with OPM)
6. Manual Data Entry: Keystroke errors, deception, etc.
7. Business Rules & Processes: (# of validated Requirements, incorrect data)
8. Workarounds: # K-Deletes, etc.
9. Data Quality from Services: (Missing data, incorrect interface edits?)
10. Staffing Level: (# of personnel, # of MIRS terminals, # trained, quality & # training resources)
11. System Reliability: (# of transmission failures & data timeliness)

Indirect Impact on Data Quality

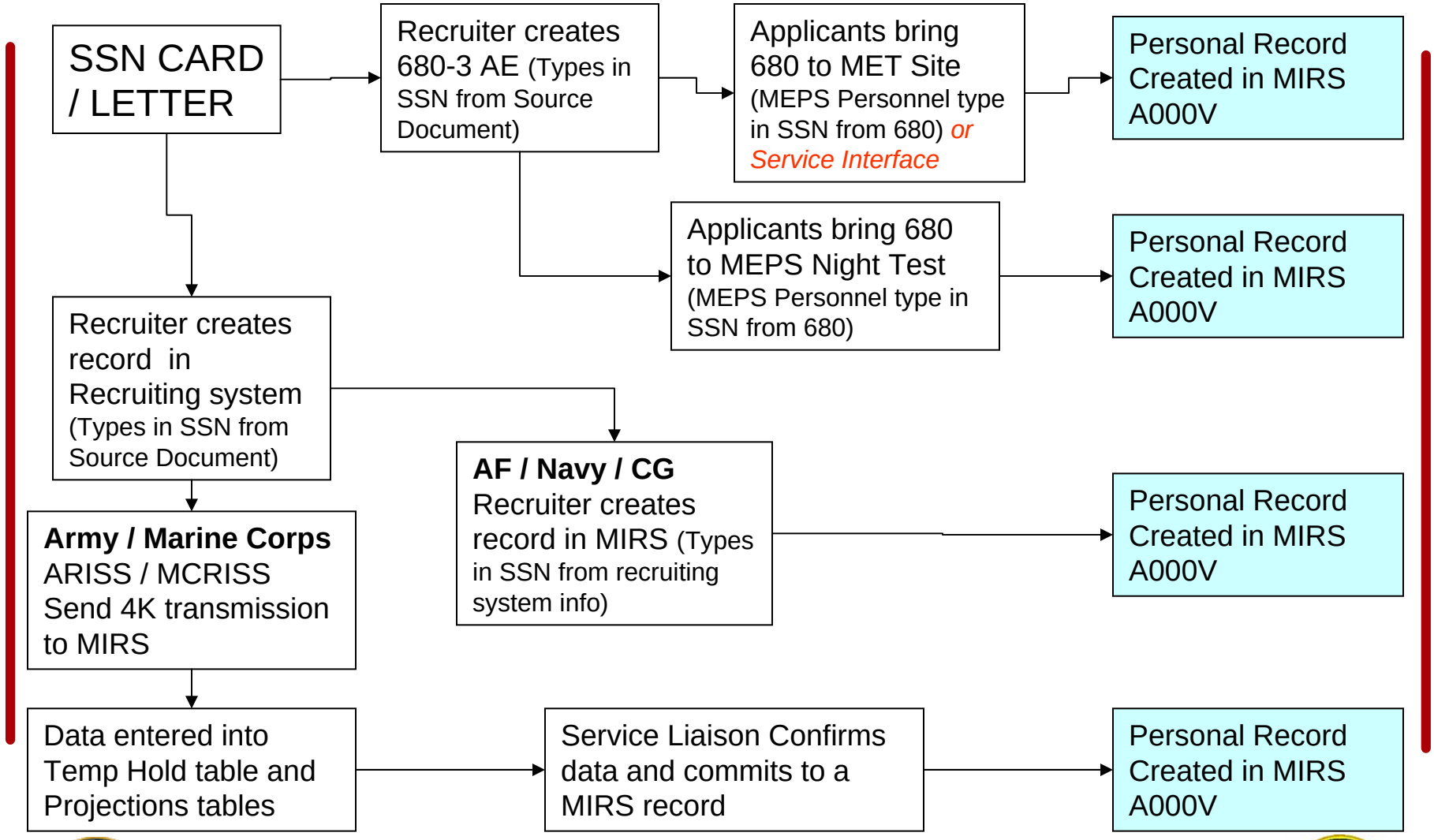
1. Measurement System
2. Database Architectures
3. Data Warehouse (Discovery)
4. Standard/adhoc Reports
5. Obsolete Hardware & Software
6. User Interfaces (Edits & correction protocols)
7. Formal Processes & Procedures/Business Rules
8. System Oversight (roles and responsibilities)
9. Forms Design/data capture
10. Regulations/Formal guidance
11. Personnel Turnover – Formal training
12. KSAs – Job description accuracy
13. Mission Pressure – Support for your customers
14. Facilities
15. System User Interface

Key Data Quality Metrics

Metrics Considered and Recommended	Metrics Considered but not Recommended
– SSN – Name – Date of Birth – Address – K-Deletes – Fingerprint – System Transmission Errors Data Logs	– HIV – DAT – Aptitude Test Score – Place of Birth – SSN Duplicates

* The team agreed that we should measure data:
  1) on the DD Form 1172-2 (DEERS enrollment),
  2) reported outside USMEPCOM upon accession into AC or RC status,
  3) widely depended upon by Community of interest, and
  4) within our control to correct.

SSN Process Flow



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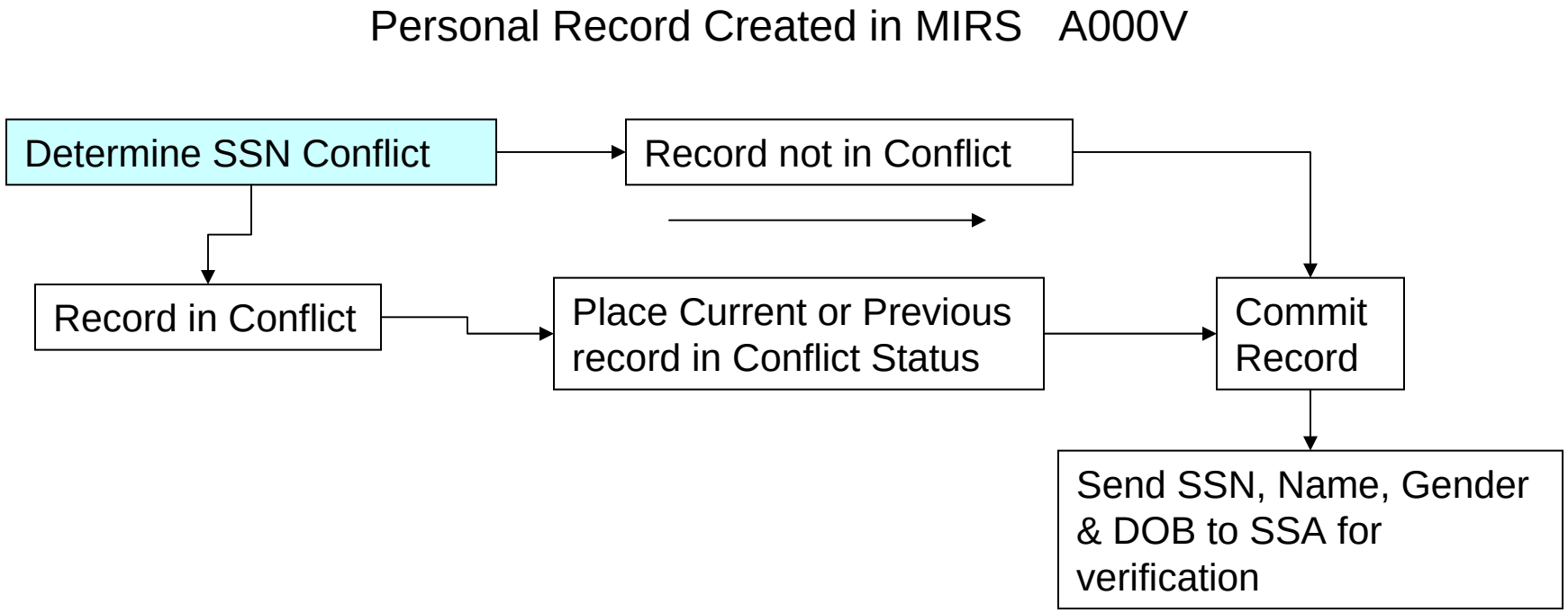
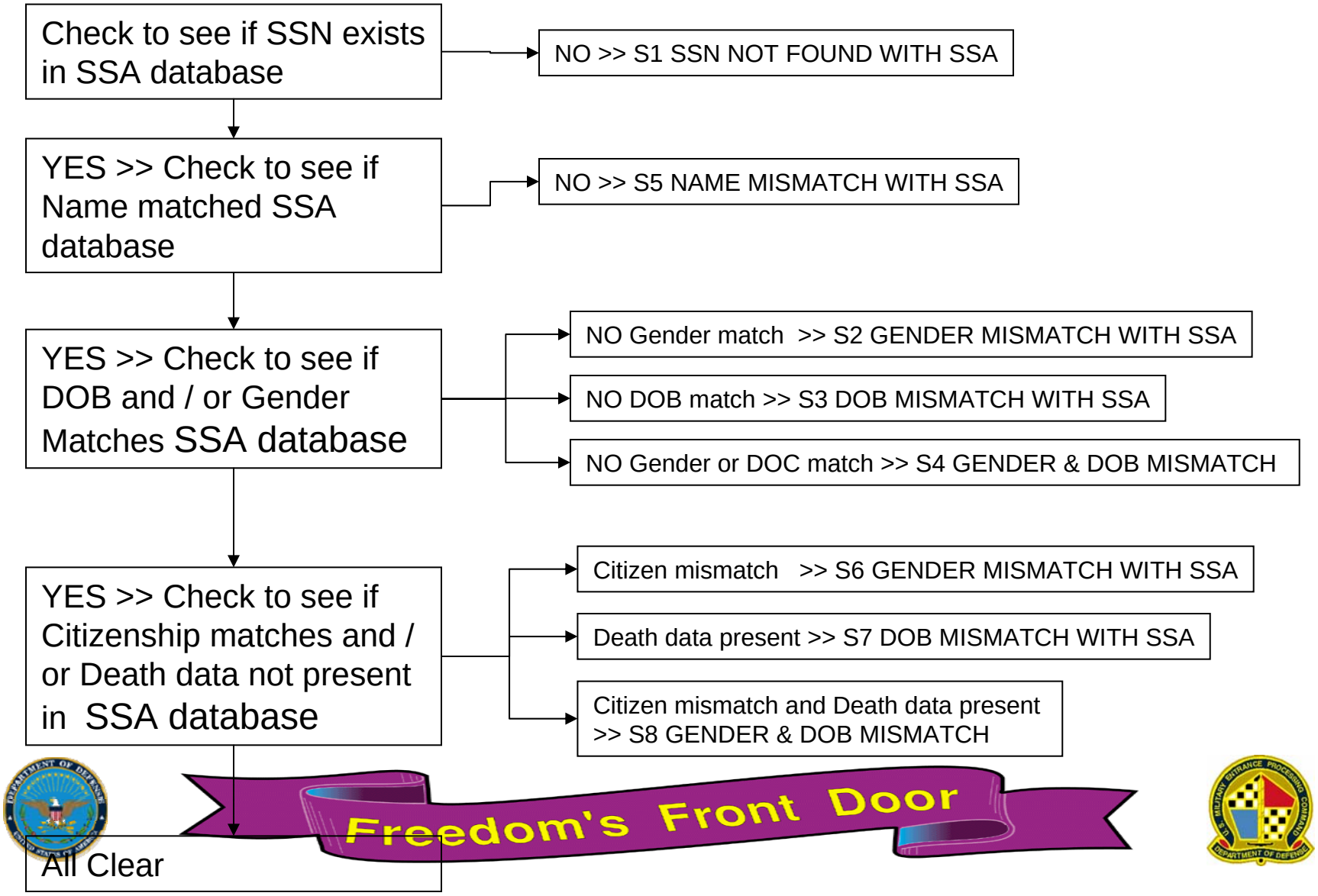
SSN Process Flow Continued



SSN Process Flow Result Codes

SSA VERIFICATION CHECK



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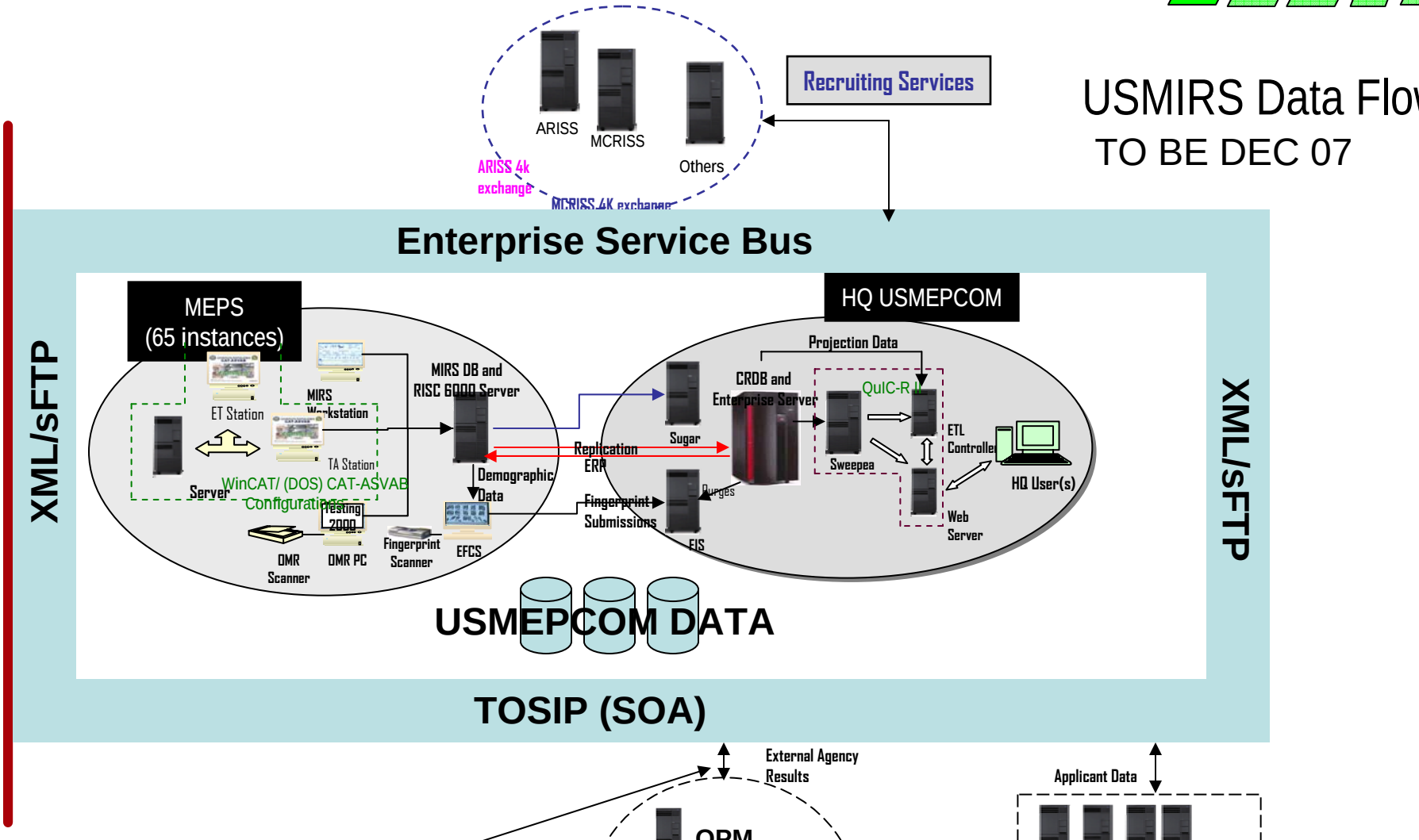
“To Be” Data Transmission Flow

D M A I C

USMIRS Data Flow
TO BE DEC 07



Metric Summary

Data Element	Error Condition	Error Test	Quality Metric	Error Standard	Weight (1-10)	POC
SSN/Name/ DOB	SSN/Name mismatch with SSA file	SSN mismatch report	Percent defective SSNs in all A000V files (by each S code1, 3, & 5) (# Defects / Total #SSN) 3 measures	1%	10	**J5**
Address	Incorrect Address	Compare to MapMarker	Percent of Address, City, State, Zip accurate compared to MapMarker (#inaccurate / total) 4 measures	1%	8	**J5**
K-Deletes	K-Delete Event	Sample CRDB monthly	Percent of K-deletes (#K-Deletes / #Unique R_ID trans)	.001%	5	**J3**
Fingerprints	Unusable fingerprint—must be redone	FBI exception report from OPM monthly	Percent resubmissions required (#Resub / #Total Submissions)	.01%	7	**J3**
System Data Logs	Transmission failure	Analyze system logs per month	Percent of data transmissions to external stakeholders that required more than one trans. (#Trans failure / Total DMDC Transmissions)	0%	1	**J6**

Each data element reported by total number of Accessions.

J5 has overall responsibility for reporting metrics based on input from POC's listed above.

Data Quality Metrics Results

Accessions — MAR — APR — MAY — JUN — **3QTR06**

Data Element	Goal	WGT	POC	% E V	% E V	% E V	% E V	% E V	Data Quality Contb *	Percent of Goal
SSN	0.100%	10	J5	0.00%	0.00%	0.00%	0.00%	**0.00%**	20.833	100.00%
Name	0.800%	10	J5	0.85%	0.87%	0.83%	0.85%	**0.85%**	20.655	93.65%
DOB	1.000%	7	J5	1.08%	0.93%	1.01%	0.67%	**0.88%**	14.455	100.00%
House # +	5.000%	2	J5	22.91%	23.02%	22.19%	22.47%	**22.54%**	3.228	22.18%
Street + City + Zip	4.000%	2	J5	22.52%	22.55%	21.72%	21.99%	**22.06%**	3.247	18.13%
City + Zip	1.000%	2	J5	14.47%	14.65%	13.72%	14.14%	**14.15%**	3.577	7.07%
Zip	1.000%	2	J5	10.64%	10.77%	10.01%	10.18%	**10.29%**	3.738	9.72%
K-Deletes	0.500%	5	J3	0.33%	0.26%	0.97%	0.70%	**0.64%**	10.350	78.19%
Fingerprints	0.750%	7	J3	0.00%	0.75%	0.78%	0.72%	**0.75%**	14.474	100.00%
System Data Logs	0.000%	1	J6	0.00%	0.00%	0.00%	0.00%	**0.00%**	2.083	100.00%

A 96% Data Quality Metric indicates that USMEPCOM's Data Quality is Good. (90-95% Poor, 95-98% Good, 98-99% Great, >99% Outstanding) **96.64** **62.8%**

** Data Quality Contribution = [(100 - % Error Value) X Weight] / Sum of Weights*

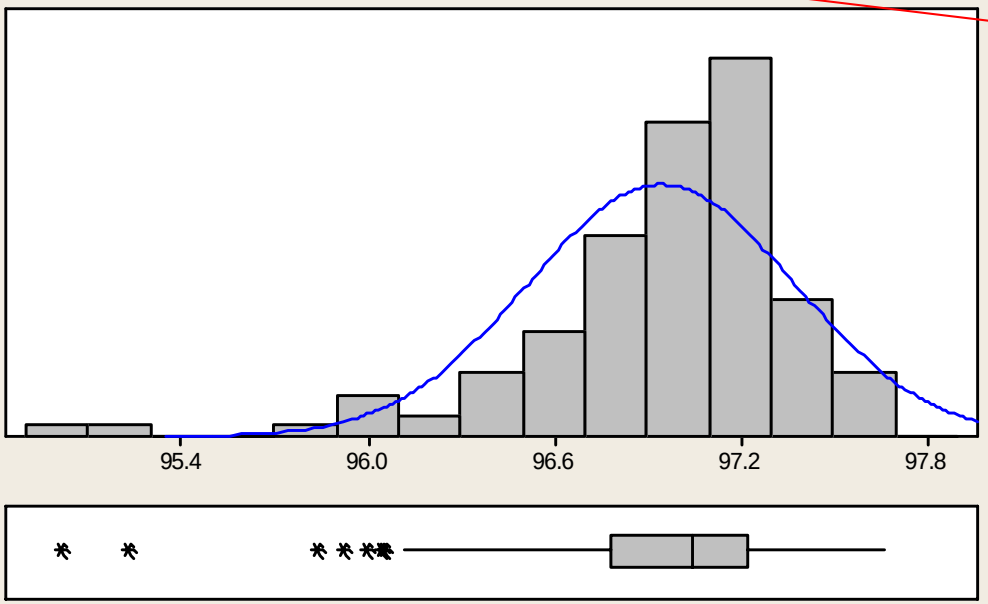
Daily Data Quality Metric Contribution

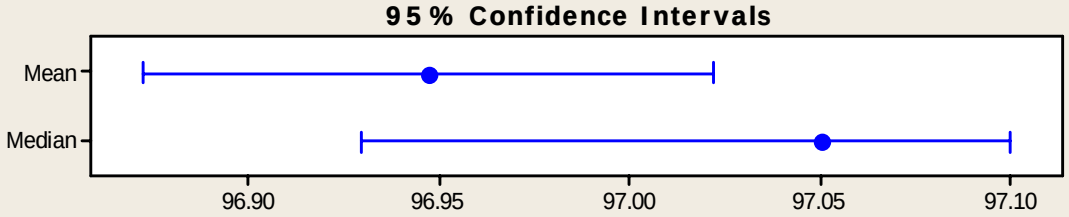
D M A I C

Summary for Data Q Contribution

FY = 2007

Normal Data Distribution



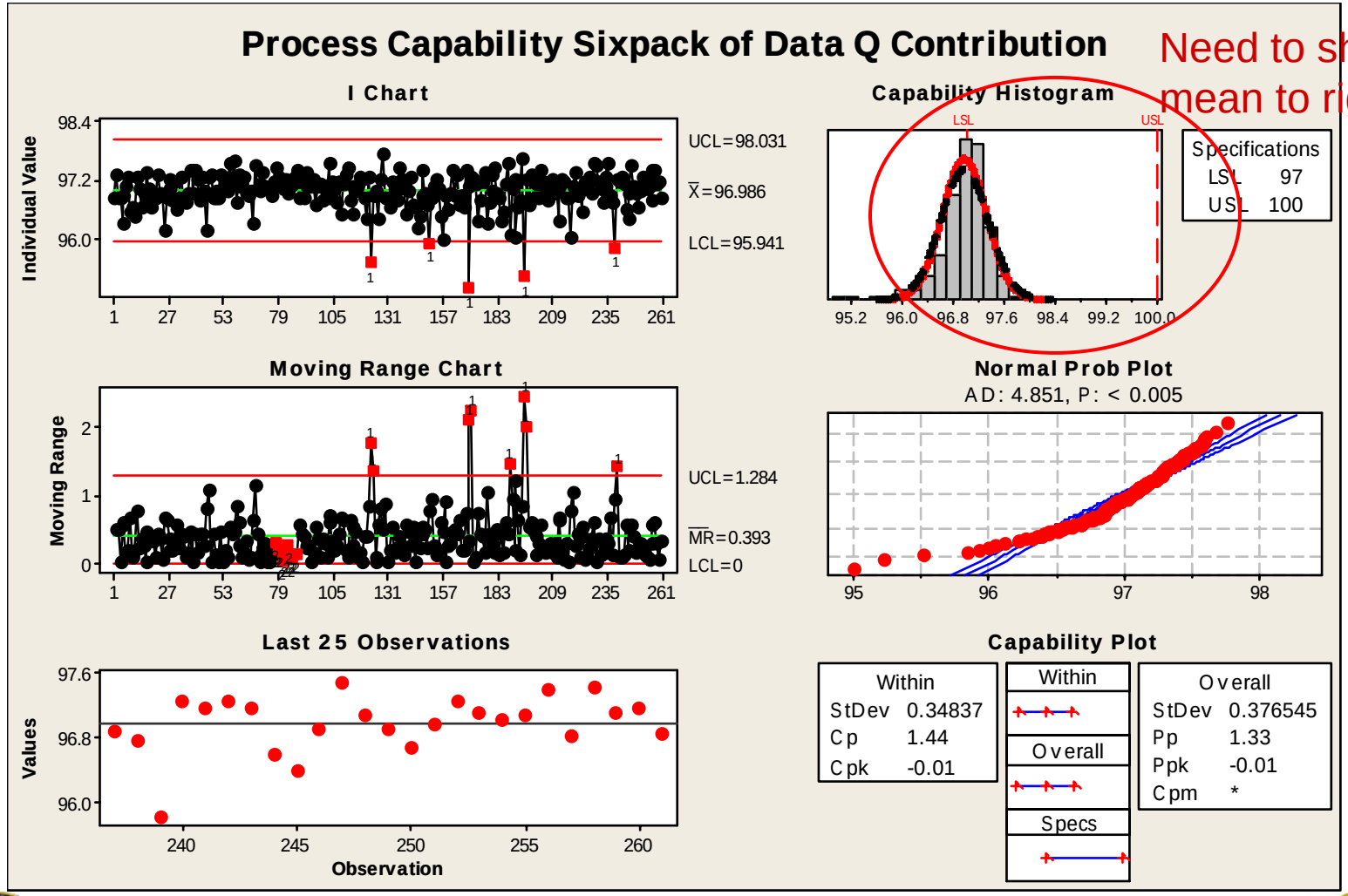


Anderson-Darling Normality Test	
A-Squared	3.16
P-Value <	0.005
Mean	96.947
StDev	0.429
Variance	0.184
Skewness	-1.62343
Kurtosis	4.31320
N	129
Minimum	95.010
1st Quartile	96.780
Median	97.050
3rd Quartile	97.230
Maximum	97.670
95% Confidence Interval for Mean	
96.872	97.022
95% Confidence Interval for Median	
96.930	97.100
95% Confidence Interval for StDev	
0.383	0.489

Freedom's Front Door

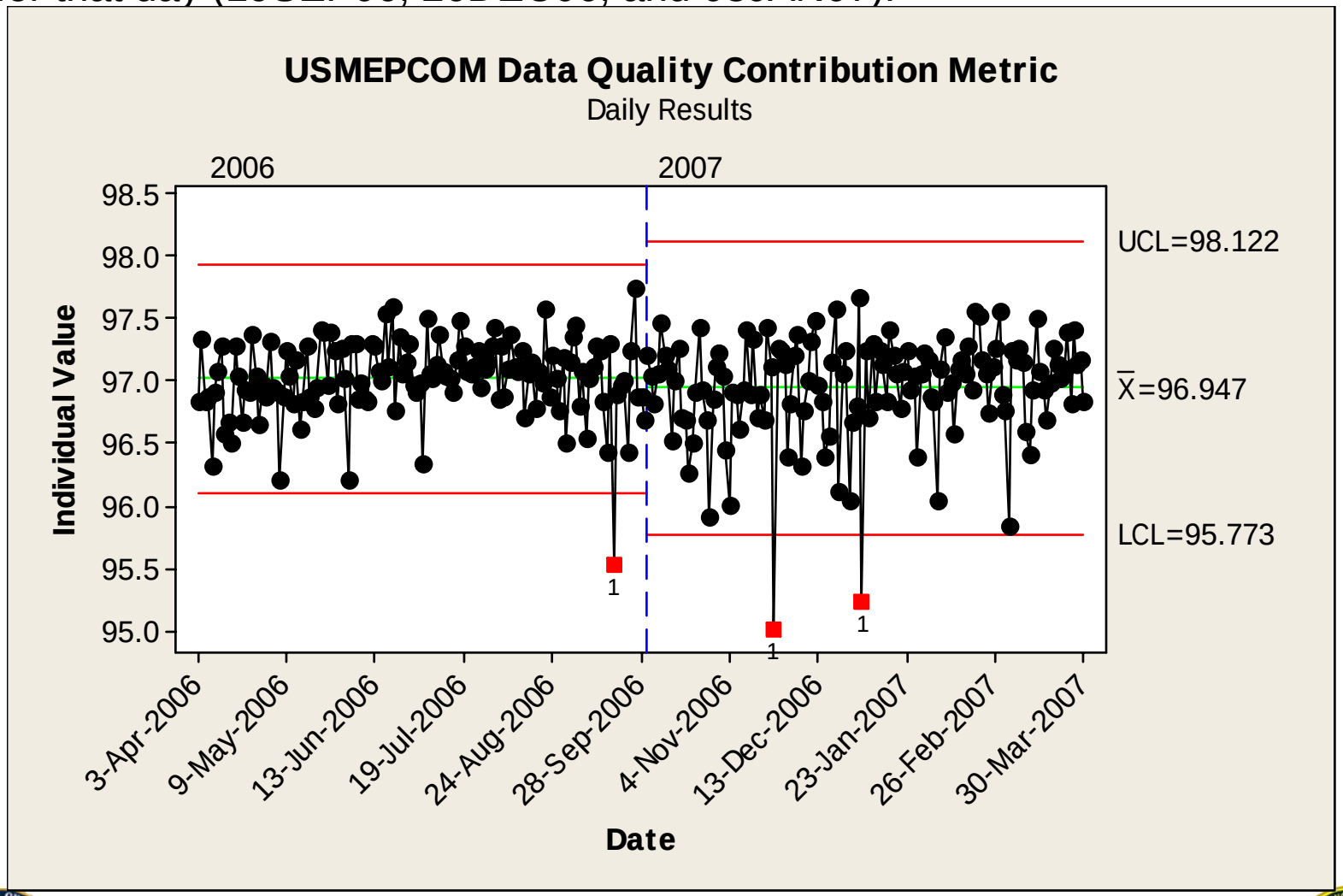
Daily Data Quality Metric Contribution

The 6-pack chart shows that the pattern of data appears random, with a near constant mean, and uniform variability = stable process.



Daily Data Quality Metric Contribution

The 3 points outside the lower control limit are due to a System Data Transmission error for that day (19SEP06, 26DEC06, and 03JAN07).



Way Ahead

- In MAY 2007, OSD AP, formed the Data Reconciliation Working Group (DRWG) to improve consistency of accession data between USMEPCOM, DMDC and the Services.
- Improve USMEPCOM data quality by implementation of automatic address correction software
- Establishment of a data quality measurement system used for monthly business reporting and management
- Document root causes of variations in data quality and provide solutions to decease variations.

DECISION

?? QUESTIONS ??

Measure	Mar	Apr	May	June	*3QTR06*	July	Aug
SSN (1) ERRORS Applicants	46	34	168	51	*253*	45	56
SSN (1) SUBMISSIONS Applicants	49578	41856	46401	48614	*136871*	44849	48913
SSN (1) ERROR RATE Applicants	**0.09%**	**0.08%**	**0.36%**	**0.10%**	***0.18%***	**0.10%**	**0.11%**
SSN (1) ERRORS Accessions	0	0	0	0	*0*	0	0
SSN (1) SUBMISSIONS Accessions	17991	14518	14171	11814	*40503*	9636	8144
SSN (1) ERROR RATE Accessions	**0.00%**	**0.00%**	**0.00%**	**0.00%**	***0.00%***	**0.00%**	**0.00%**
SSN (1) ERRORS DEPS	0-Jan	0	4	0	*4*	0	0
SSN (1) SUBMISSIONS DEPS	13499	11620	12977	15257	*39854*	13298	12706
SSN (1) ERROR RATE DEPS	**0.00%**	**0.00%**	**0.03%**	**0.00%**	***0.01%***	**0.00%**	**0.00%**
Name (5) ERRORS Applicants	980	824	943	998	*2765*	937	1152
Name (5) SUBMISSIONS Applicants	49578	41856	46401	48614	*136871*	44849	48913
Name (5) ERROR RATE Applicants	**1.98%**	**1.97%**	**2.03%**	**2.05%**	***2.02%***	**2.09%**	**2.36%**
Name (5) ERRORS Accessions	153	127	118	101	*346*	85	58
Name (5) SUBMISSIONS Accessions	17991	14518	14171	11814	*40503*	9636	8144
Name (5) ERROR RATE Accessions	**0.85%**	**0.87%**	**0.83%**	**0.85%**	***0.85%***	**0.88%**	**0.71%**
Name (5) ERRORS DEPS	98	95	115	129	*339*	110	83
Name (5) SUBMISSIONS DEPS	13499	11620	12977	15257	*39854*	13298	12706
Name (5) ERROR RATE DEPS	**0.73%**	**0.82%**	**0.89%**	**0.85%**	***0.85%***	**0.83%**	**0.65%**
DOB (3) ERRORS Applicants	577	452	525	397	*1374*	343	396
DOB (3) SUBMISSIONS Applicants	49578	41856	46401	48614	*136871*	44849	48913
DOB (3) ERROR RATE Applicants	**1.16%**	**1.08%**	**1.13%**	**0.82%**	***1.00%***	**0.76%**	**0.81%**
DOB (3) ERRORS Accessions	194	135	143	79	*357*	52	55
DOB (3) SUBMISSIONS Accessions	17991	14518	14171	11814	*40503*	9636	8144
DOB (3) ERROR RATE Accessions	**1.08%**	**0.93%**	**1.01%**	**0.67%**	***0.88%***	**0.54%**	**0.68%**
DOB (3) ERRORS DEPS	143	121	136	111	*368*	94	107
DOB (3) SUBMISSIONS DEPS	13499	11620	12977	15257	*39854*	13298	12706
DOB (3) ERROR RATE DEPS	**1.06%**	**1.04%**	**1.05%**	**0.73%**	***0.92%***	**0.71%**	**0.84%**

Freedom's Front Door